Miscellaneous Containers Solutions

Copyright © James Raynard 2021

std::forward_list

- What are the main differences between std::list and std::forward_list?
  - std::list is a double-linked list, std::forward_list is single-linked
  - std::list supports forward and reverse iteration, std::forward_list is forward only
  - std::list has some extra member functions - size(), push_back(), back()
  - Some member functions are different - insert(), erase(), splice() in std::list are insert_after(), erase_after(), splice_after() in std::forward_list

Copyright © James Raynard 2021

std::forward_list

- Write a program which
  - Creates and populates an std::forward_list object
  - Sorts the list
  - Finds an elements with a given value and inserts another element after it
  - Removes the first element
  - Clears the list
- After each operation, print out all the elements of the list

Copyright © James Raynard 2021

Unordered Associative Containers

- What are the unordered associative containers?
  - unordered_map, unordered_multimap, unordered_set and unordered_multiset
- How do they differ from ordered associative containers?
  - The < operator of the key is not used to order the elements
  - Instead, the hash values of the keys are used
  - This gives better performance, as it compares numbers instead of complex objects

Copyright © James Raynard 2021

Unordered Container Operations

- What operations are available for unordered containers?
  - Similar to ordered containers
  - Reverse iteration is not supported
  - lower_bound() and upper_bound() are not supported for unordered_multimap and unordered_multiset

Copyright © James Raynard 2021

Sorting an unordered container

- Write a program which uses an unordered container, then stores the data in an ordered container
- Give an example where this would be useful
  - In code which is required to produce an ordered container, but performance is important
  - The processing can be done using unordered containers, then the results stored in an ordered container
  - When the data is stored in the ordered container, it will automatically be sorted
  - This will give better performance than using an ordered container throughout, as there is only one step which incurs the overhead of sorting the data

Copyright © James Raynard 2021